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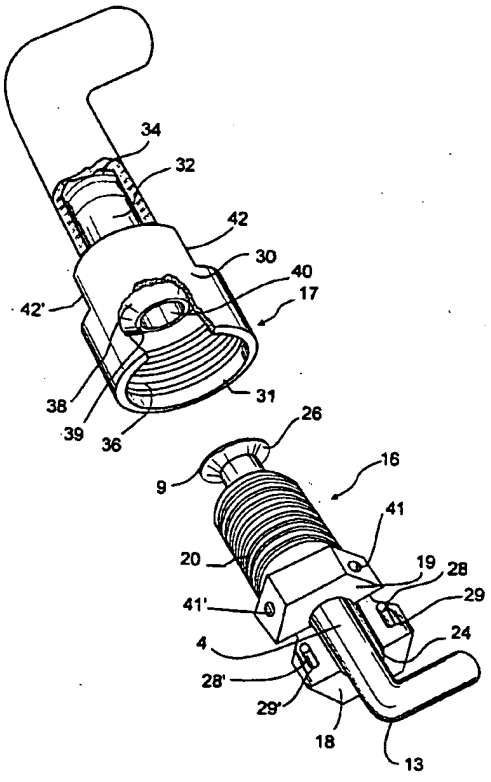
(54) Title: UNIVERSAL CONNECTOR FOR INTERCONNECTING FLUID CARRYING COMPONENTS OF BEVERAGE DISPENSING DEVICES



(57) Abstract: The present invention relates to a universal connector for interconnecting fluid carrying components and fluid lines along a common flow path within a beverage dispensing apparatus which eliminates welding and the occasional waste of material during the manufacture stage since it is not necessary to pass the fitting over the connection end before it is flared. The universal connector comprises a first member (16) adapted to snap around a wall portion (4) of a short flared connection end (9) and a second member (17) adapted for flow communication with the respective other connection end and comprising a casing (30) defining a cavity with an open connection side (31) and a mating portion (38, 39) to mate with said at least one flared connection end. The universal connector of the present invention eliminates the use of washers, O-rings and similar seal components in beverage dispensing apparatus.

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Title: "UNIVERSAL CONNECTOR FOR INTERCONNECTING FLUID CARRYING COMPONENTS OF BEVERAGE DISPENSING DEVICES"

Field of the Invention

The present invention relates to a universal connector for interconnecting fluid carrying components and fluid lines along a common flow path. More particularly, the present invention relates to a universal connector comprising two members formed separately with respective mating connection portions to be mounted on connection sides of fluid carrying components within beverage dispensing equipment which eliminates welding and the occasional waste of material during the manufacture stage since it is not necessary to pass the fitting over the end before it is flared for connection.

Background of the Invention

Beverage dispensing apparatus are considered heavy duty type devices and are normally installed in fast food outlets, restaurants and the like for serving a variety of cold beverages such as cold carbonated beverages or casual drinks from a respective dispensing valve located on the front panel of the dispenser. These dispensing apparatus are also referred to as postmix and premix beverage dispensing apparatus, depending on whether the beverage results from mixing syrup and carbonated water within the dispensing valve or whether it is pumped from a product tank containing the end mixture.

A post-mix beverage dispensing apparatus basically includes one or more pairs of cooling coils for chilling flows of carbonated water and flavoring syrup, a manifold with a plurality of outlets and one or more beverage dispensing valves in flow communication by means of respective hoses and stainless steel conduits. A premix beverage dispenser, on the other hand, is generally connected to a product tank already containing the mixed end product beverage. In these devices, when the beverages are carbonated, carbon dioxide is added to the product providing for a desired carbonation pressure head to the beverage dispensing apparatus. A plurality of refrigerant filled coils, that are mechanically tailored to form an ice bank, are surrounded with conduit coils carrying the beverage product at desired temperature to the dispensing valve.

An exploded view of a Venture model of post-mix beverage dispensing units as contained on page 8 of the maintenance catalogue entitled "Catálogo Técnico Cornelius" (Portuguese-Spanish version, edition December 1997) is incorporated by reference herein so that the fluid carrying components need not to be described in full detail and is shown in figure 1. According to figure 1, a plurality of stainless steel syrup coils 200, 430, water coils 230,240, a pre-carbonation coil 420 and at least one manifold 90 having 5 outlets are provided with conventional fittings integrally mounted on respective inlet and outlet sides among other components of the dispensing unit. Further fluid lines are plastic tubes 80, 150, 310, 340.

As is realised, the illustrated beverage dispensing unit is standard modularised equipment wherein the size and orientation of the components forming the fluid circuit cannot be changed. Specifically, opposite axial connection sides are in mutual alignment and close enough to allow the connection of the devices located upstream and downstream of said connection sides.

Those skilled in the art recognize that there are numerous limitations and disadvantages in the manufacture and/or maintenance of such beverage dispensing apparatus components with conventional fittings on the connection ends of these components.

As is best shown in Figure 2, the prior art fittings mounted on the connection ends of coils 200, 230,240, 420 or 430 of figure 1 normally comprise a male fitting 1 of tubular shape with treads 6 machined on an outer wall section between a gripping portion 7 and a frusto conical abutting rim 8. The gripping portion 7 of male fitting 1 is welded to the inlet side 3 closed to curve 5 by a circumferential weld as indicated by weld string 7'. It is a complicated and expensive stainless steel welding process which requires perfect abutment of the circular rims of wall 3 and flange portion 7.

Co-axially, opposite said male fitting 1, connection end is flared 9 with an adjacent short straight portion of tube 4 limited by a curve 13. A freely rotatable coupler 2, generally nut shaped, is mounted on said short straight portion of tube 4. Nut 2 is a high precision machined mounting component having a gripping portion 10 on the outer wall and treads 11 on opposite inner wall, the gripping portion extending to an adjacent neck portion 12 with an inner diameter slightly greater than the outer diameter of the connection end 4. The inner diameter defines, in radial direction, an adjacent circumferential guiding wall 14 for guiding said nut 2 along the outer wall of the short straight portion 4 between flared end 9 and coaxial adjacent curve 13.

The fluid tight coupling between inlet 3 and outlet 4 connection ends 3 and 4 respectively is achieved with a washer 15 which seals the flared end 9 against the annular abutting rim 8 when the nut type coupler 2 is treaded on male fitting 1.

Due to the periodic maintenance of the aforementioned beverage dispensing equipment, fittings and washers of the fluid carrying components become worn and/or defective. More specifically, there is deformation of the nylon washer 15 and damage to the treads 6,11. As a result, misalignment between fittings 1 and 2 arises thereby causing fluid leaks at the connection ends 3 and 4.

Worn conventional fitting 1 or/and 2 cannot be removed from their respective ends 3 and 4 unless the tips of the connection ends are cut away and a new male fitting is welded on one end and a corresponding new nut is passed over the opposite connection before being flared.

However, coils 200, 230, 240, 420 and 430 and manifolds of figure 1, like many other fluid carrying components of industrial manufacture, are of standard construction with strict dimension requirements therefore it may not be possible to reconnect the two opposite connection sides when the relative connection point is changed.

On occasion, coils and other fluid carrying components with a flared connection end are discarded because nut 2 of inner diameter less than the outer diameter of flared end was not passed over the straight portion end before flaring end 9 during the manufacture stage.

Due to these reasons, the strict dimension requirements make it difficult to replace only the conventional fitting in a beverage dispensing unit within a short period of time. The connection fitting is of integral construction with the connection end. The strict orientation and size requirements of the fitting result in the unit often having to be completely or partially disassembled for repair and/or maintenance. This is reflected in the increased costs associated with beverage dispensing units.

The typical time that it takes to replace the worn fittings and defective washers and the discard of stainless steel components due to worn treads is of great concern from a financial standpoint for both the fast food outlets and the manufacturer of the device.

Accordingly, the technical problem underlying this invention is to provide a universal connector for use in apparatus such as the aforementioned beverage dispensing ap-

paratus which has such constructional and operational features as to overcome or substantially reduce the aforementioned problems of the prior art fittings.

Objects of the Invention

It is a primary object of the present invention to provide a universal connector which can be readily coupled to the connection sides of the fluid circuits carrying components with a minimum amount of effort thereby reducing the time involved in production and maintenance and the quantity of components which are normally discarded in view of damaged fittings.

A further object of the universal connector of the present invention is to avoid leaks that occur when the prior art standard threaded fittings of figure 2 are used in beverage dispensing apparatus and to eliminate washers, 0-rings and similar seal components.

Another object of the universal connector of the present invention is to provide for replacements of worn connectors whenever necessary without interfering in the connection point and sizes of the stainless steel fluid carrying components while also providing for a fluid tight connection.

It is still yet another object of the present invention to provide for the cost effective production and maintenance of beverage dispensing apparatus and associated devices by providing with the universal connector of the present invention, the inlet and outlet sides of the fluid carrying components.

The universal connector of the present invention overcomes these and other normally accepted limitations in manufacture and servicing of the beverage dispensers with stainless steel fittings of conventional design which prevail for a long time.

Summary of the Invention

The present invention provides a universal connector for interconnecting connection ends of fluid carrying components along a common flow path with a radial enlargement on a wall portion on one of said connection ends.

The universal connector of the invention comprises first and second coupling members that are formed separately and have respective mating connection portions for mutual coupling when in use.

The first member comprises first and second means adapted to snap around a wall portion of one said connection end with said radial enlargement in any angle of radial direction providing the appearance of a uniform piece.

The mating second member comprises a casing adapted for flow communication with a corresponding fluid carrying component and includes a cavity with an open connection side and a radial mating portion which encircles a central bore through which fluid flows, when the connection end with the enlargement is urged against the radial mating portion by the first member. The casing and the radial mating portion are integrally molded.

The second member can take either the form of a plug-in member or can be integrally molded with a region of the body of a valve whereby the open connection side corresponds to the inlet side of the valve.

The invention further provides a method of assembling and/or servicing beverage dispensing units by providing axially opposite connection ends of fluid carrying components along a common flow path with a radial enlargement on a wall portion of at least one of said connection ends with the fittings of the universal connector of the invention.

Still another aspect of the present invention is to provide fluid carrying components of different shapes with connection ends that do not have permanently mounted coupling components located thereon within a beverage dispensing unit.

Description of the Drawings

The features and advantages of the universal connector according to the present invention will be more clearly understood from the following detailed description of an embodiment thereof, to be taken by way of example with the accompanying drawings wherein:

Figure 3 is a side sectional elevation of the universal connector according to the preferred embodiment of the present invention.

Figure 4 of the present invention is a partially broken perspective view of the universal connector of figure 3.

Detailed Description Of The Invention

According to the preferred embodiment shown in Figure 3 of the present invention, the universal connector comprises separate first and second members 16, 17 having

respective mating connection portions 20, 36 for mutual coupling to interconnect connection ends 4 and 33 of respective fluid carrying components along a common flow path.

Connection ends 4, 33 comprise short straight portions. Generally connection end 4 is provided with an enlargement in the form of a flange or flare flared 9 with rear side 26 axially opposite first member 16.

According to a main feature of the invention, member 16 is of snap type construction and comprises directly opposite first and second circular wall portions 18, 19 joinable by a mechanical interference means to form a consecutive first member.

It will be appreciated that member 16 can comprise other directly opposite means provided with a snap arrangement.

As is best shown in the figure, member 16 is a nipple shaped fitting comprising two snap acting opposite wall portions 18, 19 with respective treaded nipple wall section 20 and an adjacent head section 21 between ends 22, 23.

Nipple shaped fitting 16 has an inner diameter which is equal or slightly greater than the external diameter of the round straight portion 4 but less than the outermost diameter of enlargement 9.

Head portion 21 is nut shaped with opposite gripping surfaces 27. It is possible to have different head designs. For example a butterfly nut shaped head would allow a manual tight without using an open wrench.

The other connection side 33 is provided with second member 17 which includes a casing 30 of substantially tubular shape and co-axially opposite an open connection side 31 a plug-in portion 32 with ribs 34 for insertion in an inlet end.

It is also possible to mold casing 30 with parts of the body of a dispensing valve forming an integral construction, the open connection side 31 corresponding to the rear inlet side the dispensing valve.

Casing 30 has an inner diameter which defines in radial direction, an inner adjacent cylindrical side wall 35. A first portion of said cylindrical side wall 35 is provided with mating connection portions formed by treads 36 for mating the treaded section of nipple wall 20 on first member 16.

It will be appreciated that mating treads 20, 36 and mating inner and outer walls of respective member 16 and straight tube portion 4 assist in the mechanical interference to form the consecutive shape of the two directly opposite means 18, 19 of member 16.

Adjacent said treads 36, a recessed region portion 37 is formed by said cylindrical wall 35 and a bottom protrusion 38. Bottom protrusion 38 is integrally molded with casing 30 and includes a circular seat 39 which encircles central bore 40 through which fluid flows in the form of a counter flange region.

Accordingly, flared end 9 abuts against circular seat 39 urged on the rear side 26 by screwing nipple fitting 16 into cavity 30, providing a fluid tight connection without using washers, 0-rings or any similar deforming spare parts.

Figure 4 is a perspective view of adapter fitting 17 and nipple fitting 16 ready to snap on connection end 4.

As can be observed, wall portions 18, 19 of nipple fitting 16 snap around a wall portion of connection end 4 between the flared end 9 and curve 13 at any angle in radial direction.

A pair of pins 28, 28' is inserted in a respective pair of holes 29, 29' symmetrically located in wall portion 18. Pins 28, 28' extend from wall portion 18 in alignment into a corresponding pair of holes 41, 41' on directly opposite wall portion 19 providing the appearance of a uniform piece when in mounted condition.

The snap means is not limited to the pair of pins and may comprise ribs and slots or planes integrally molded or other mechanical interference means joined by wall portions 18, 19.

Cylindrical guiding wall 24 of diameter slightly greater than the outer circumference of straight portion 4 enables nipple shaped fitting 16 to circumnavigate at any point of the straight portion 4 of the conduit.

Due to the ability of halves 18, 19 to be disassembled from one another and readily reassembled, it is possible to provide the connection end with a fitting 16 overcoming the limitations of the prior art fittings since fitting 16 does not pass over the flared end 9 of the conduit.

Besides a strong reduction in servicing time a greater lifetime is obtained since there is no interference with the flared end 9.

Moreover, the snap construction enables quick replacement of the nipple fitting 16 while maintaining the fluid carrying component within the flow circuit.

As is best shown in the perspective view, mating protrusion 38 within casing 30 has a slight swiveling shape so that it can take up any slight misalignment between the flared end 9 and the outermost rim portion 39 thereby ensuring alignment with port 40 through which fluid flows.

It is possible to have a bottom protrusion 38 within cavity 30 with different mating profiles such as conical, round or half-round cross section.

As shown in the figures, annular rim 39 has a diameter slightly less than the external diameter of flared end 9 however central bore 40 has a diameter slightly less than the internal diameter of flare 9.

Regardless of the mating profiles utilized, screwing nipple fitting 16 into casing 30 for full engagement will cause rims 25 and 39 on respective first and second members 16, 17 to radially compress on opposite sides of flared end 9 thereby providing a fluid tight connection.

A pair of recesses 42, 42' is provided on the external wall of casing 30 on diametrical opposite locations.

According to the invention, only the two members 16, 17 with the claimed features are necessary, both members being injection molded and comprising any material capable of being injection molded such as, but not limited to, thermoplastic materials.

The invention has been described above with reference to the preferred embodiment however it will be appreciated that the universal connector is not restricted to the aforementioned utilization. Fittings 16, 17 can also be used on connection sides of chillers and integrated dispenser units. Furthermore, fittings 16, 17 of the connector can be coupled to low pressure lines of measuring and control devices, capillary tubes of pressure switches, medical equipment and any applications where the pressure and temperature parameters do not exceed the respective ranges determined by the resistance of the materials and type of threads or equivalent elements involved.

Therefore, it should be understood that changes may be made with regard to this embodiment without departing from the broad scope of the claims.

CLAIMS

What is claimed is:

A universal connector for interconnecting axially opposite connection ends (33, 4) of respective fluid carrying components along a common flow path with a radial enlargement (9) on a wall portion of at least one of (4) said connection ends, comprising

first and second members (16, 17) formed separately with respective mating connection portions (20, 36) for mutual coupling thereof; wherein

said first member (16) comprises first and second means (18, 19) adapted to snap around said wall portion of said one connection end (4) with said radial enlargement (9);

said second member (17) adapted for flow communication with the respective other connection end (33) and comprising a casing (30) defining a cavity with an open connection side (31) and a mating portion (38,39) of integral construction extending from a bottom region with a central bore (40) through which fluid flows, to mate with said at least one radial enlargement (9) when said radial enlargement (9) is urged against said radial mating portion (38, 39) by said first member (16).

The connector of claim 1 wherein said first member comprises an integrally molded snap arrangement joined by said first and second means (18, 19).

The connector of claim 1 wherein said first member comprises a mechanical interference means joined by said first and second means (18, 19).

The connector of any of claims 1 or 2 wherein said first and second means (18, 19) comprise directly opposite snap acting round wall portions to form a uniform piece with an internal diameter less than the outer diameter of said radial enlargement (9).

The connector of claim 1 or 3 wherein said mechanical interference means comprises at least one pin (28) inserted into one of said directly opposite wall portions (18,19).

The connector of any of the preceding claims wherein said first and second means (18, 19) comprise treads (20) on a outer wall section and gripping means (27) on an adjacent head section (21) respectively.

The connector of claim 6 wherein the head section 21 comprises a pair of diametrically opposite gripping surfaces (27).

The connector of claim 1 wherein the head section (21) is nut shaped.

The connector of claim 1 wherein the central bore (40) has a diameter said central bore diameter equal to or slightly less than the internal diameter of said enlargement (9).

10.The connector of claim 1 wherein the mating portion (38) comprises a counterflange integrally molded on said second member (17) which abuts with a portion of said enlargement.

11.The connector of claim 1 or 10, wherein the mating portion (38) of said second member (17) includes a half-round mating surface.

The connector of claim 1 or 10 wherein the mating portion (38) of said second member (17) includes a conical mating surface.

The connector of claim 1 wherein said counter-flange includes an annular rim (35).

The connector of claim 1 wherein said annular rim (39) has a diameter said annular rim (39) diameter slightly less than the internal diameter of said enlargement (9).

15. The connector of any of claims 1 wherein said first and second members 16, 17 directly abut on opposite sides of said flared end (9).

The connector of claim 1 wherein said casing (30) comprises a shank portion extending from wall portion of said casing.

The connector of claim 1 wherein said first and second members (16, 17) comprise material capable of being injection molded.

The connector of claim 1 or 17 wherein said first and second members comprise thermoplastic materials.

19. A beverage dispensing unit of the type which includes fluid processing and fluid carrying components for chilled carbonated water and flavouring syrup flows and at least one drink dispensing valve wherein at least a pair of axially opposite connection ends (33, 4) of said fluid processing and/or carrying components is provided with the connector according to any of the precedent claims.

20. A fluid carrying component of constant diameter with a plurality of curves between the outlet-end and inlet-end of said fluid carrying component within a beverage dispensing unit, with at least one end having an enlargement wherein said inlet and outlet connection ends are provided with fittings for interconnecting said fluid carrying component along a common flow path the permanently mounted coupling fittings being excluded.

21. A method for interconnecting a connection end (4) of a fluid carrying components along a common flow path with a radial enlargement (9) on the distal end and a axially adjacent curve within a cavity wherein a fitting comprising first and second directly opposite means (18, 19) snaps around a wall portion of said connection end (4) between said radial enlargement and adjacent curve.

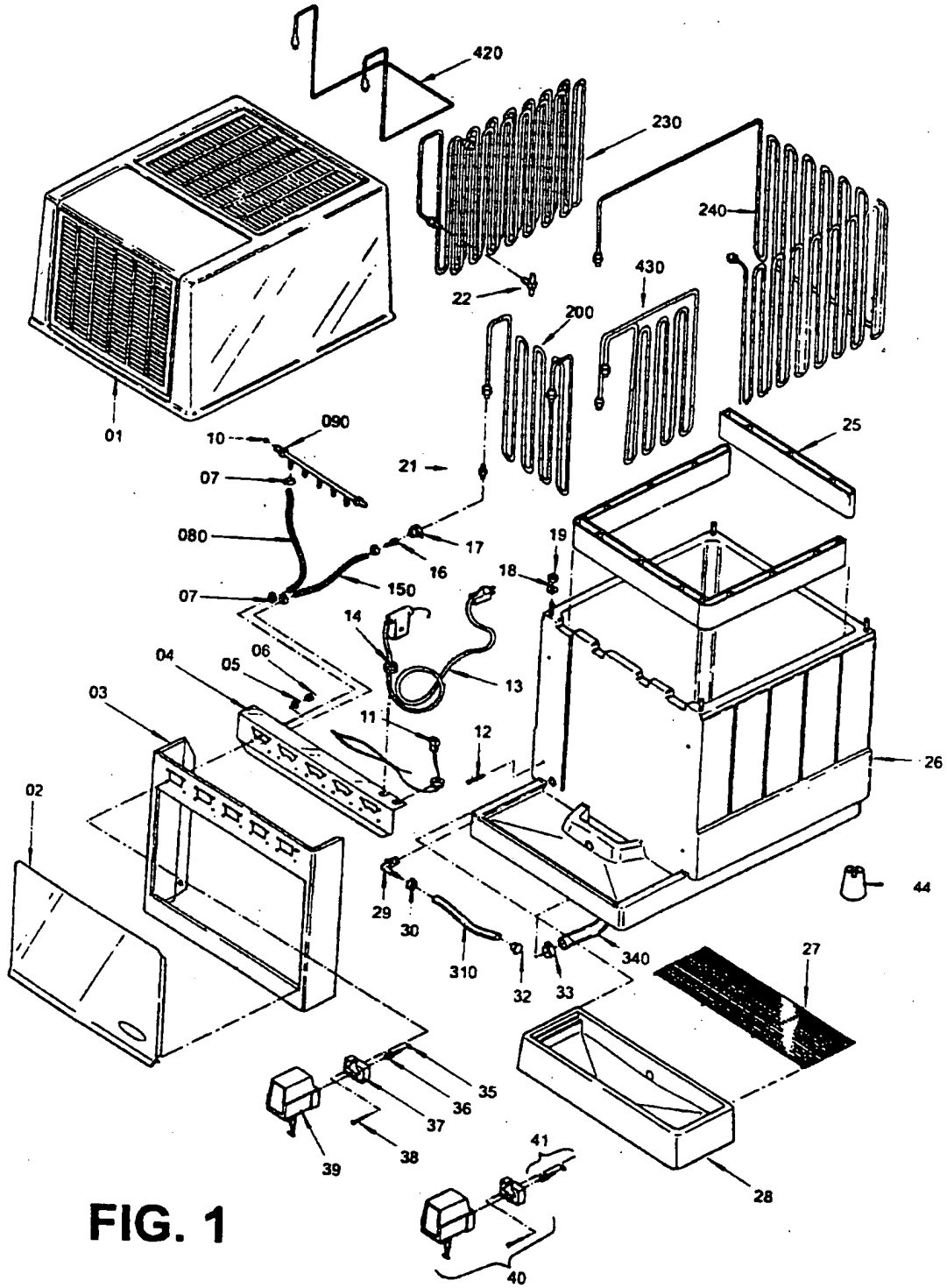
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FIG. 1

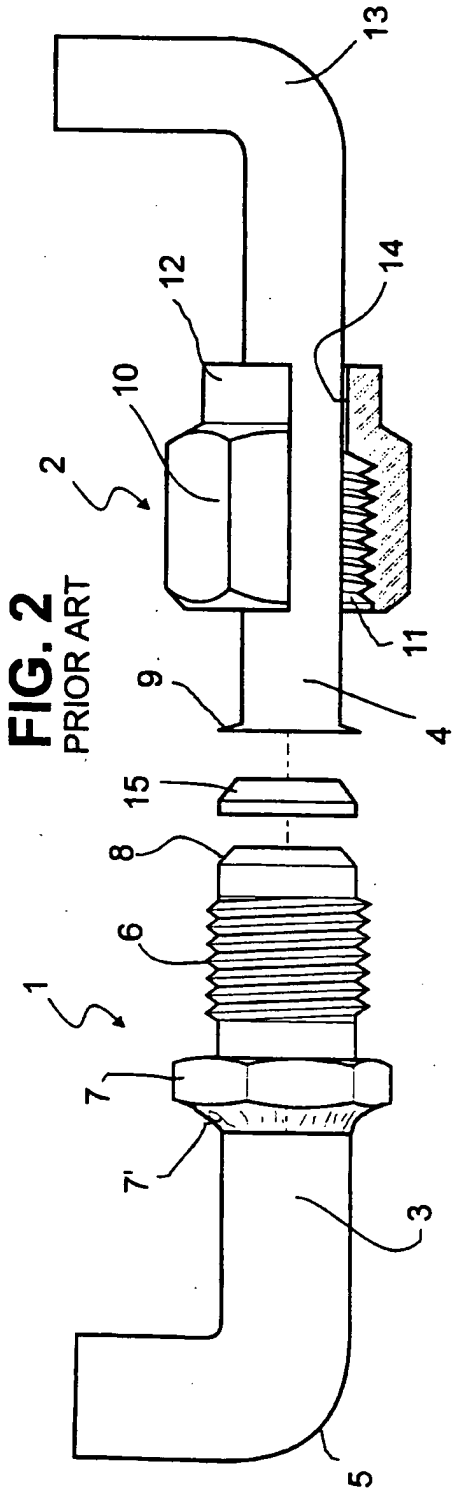

FIG. 2
PRIOR ART

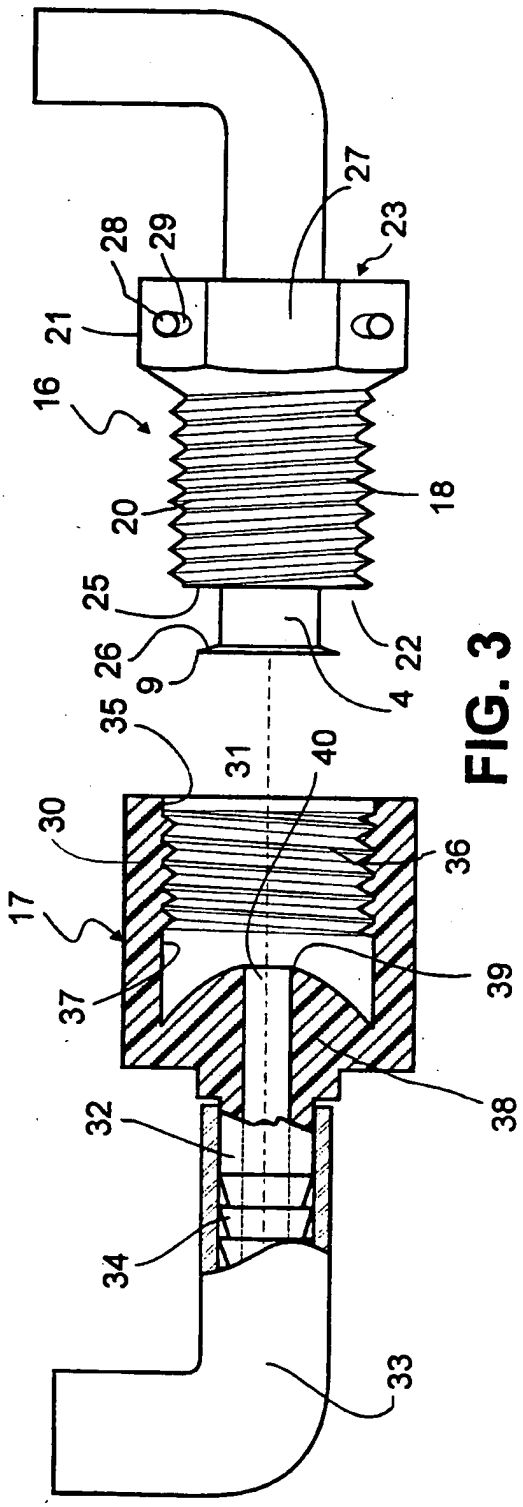

FIG. 3

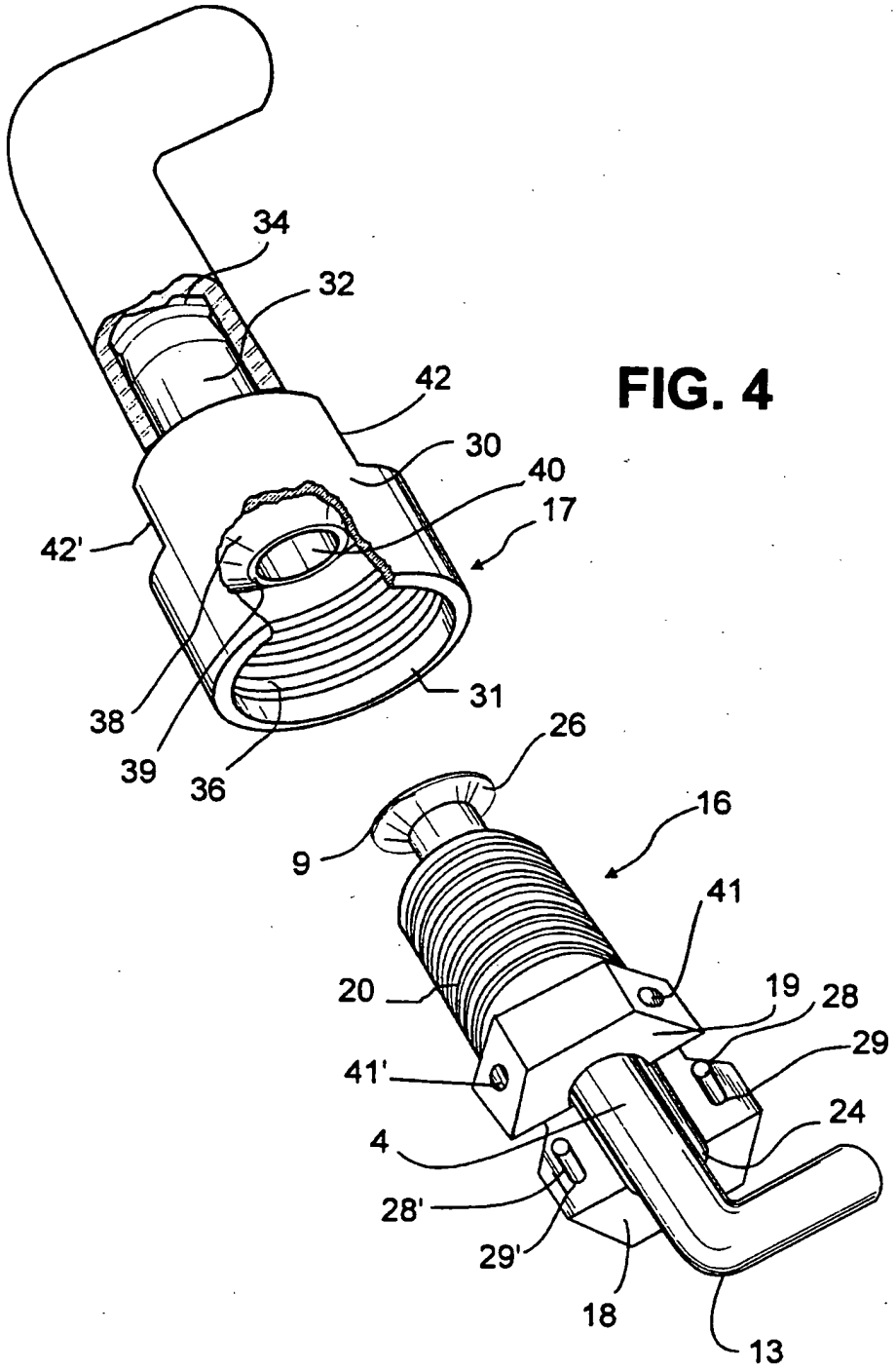
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FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/BR 99/00061

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: F16L 19/02
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: F16L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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"A" document defining the general state of the art which is not considered to be of particular relevance
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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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Date of the actual completion of the international search	Date of mailing of the international search report
13 March 2000	04.05.00

Name and mailing address of the International Searching Authority
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INTERNATIONAL SEARCH REPORT

International application No.
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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